Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
30 SEP 1997		**00-00-1997 to 00-00-1997**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Measurements of RCS and Doppler Surface Currents in a Field Environment	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **University of Massachusetts,Microwave Remote Sensing Laboratory,Knowles Engineering Building, Room 113,Amherst,MA,01003**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a REPORT	b ABSTRACT	c THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**2**	

MEASUREMENTS OF RCS AND DOPPLER SURFACE CURRENTS IN A FIELD ENVIRONMENT

Robert E. McIntosh
Microwave Remote Sensing Laboratory
Knowles Engineering Building, Room 113
University of Massachusetts
Amherst, MA 01003
phone: (413) 545-0779, fax: (413) 545-4652, e-mail: mcintosh@ecs.umass.edu
Award #: N00014-95-1-0832

LONG-TERM GOAL

Our long-term research goal is more complete understanding of air-sea interactions through microwave remote sensing techniques and the development of remote sensing technology to achieve this end.

SCIENTIFIC OBJECTIVES

Our research objective was to determine whether the surface manifestations of shallow moored objects in the presence of waves and currents may be detectable via microwave radar.

APPROACH

FOPAIR, a high-resolution imaging radar was deployed during the ONR Mine Surface Effects (MISE) Experiment held at Duck, NC during May--June, 1996. The radar was used to image the surface immediately above and surrounding a number of test targets deployed at various mean depths that were further modulated by the tide. Power and Doppler velocity image measurements would be analyzed to deduce the presence of surface signatures such as wake features.

WORK COMPLETED

Experiment preparations, including the development of a real-time DSP processor for FOPAIR and the fabrication of a turntable to hold FOPAIR, two other radar systems (from NRL and JHU/APL), and video and IR imagers were completed. Experiment operations were successful. Measurements have been processed and analyzed.

RESULTS

Under the range of conditions encountered, surface wake signatures were detectable only in cases when targets were in broaching or near-broaching conditions. In such cases, turbulence induced by the surface disturbance appeared to suppress free capillary waves on the wind-driven surface resulting in reduced backscatter levels and reduced Doppler velocity magnitudes in the wake region.

IMPACT/APPLICATION

Given the measurements obtained, the use of radar for reliable detection of shallow moored bodies appears limited to cases when the body itself is quite close to or broaching the surface.

TRANSITIONS

As part of the analysis, radar derived near-surface currents obtained under a variety of conditions were compared to in-situ estimates provided by ADCP. We feel confident that our radar-derived

estimates can be used, in general, for near surface current measurement. Results have been submitted for publication [1].

REFERENCES

[1] Moller, D., et al., 1997. "Radar Derived Interferometric Surface Currents and their Relationship to Subsurface Current Structure", submitted to Journal of Geophysical Research (Oceans).